TDRSS Support of Space Network Interoperable PN Code Libraries, Suggested Implementation,

The general approach suggested by WSC to achieve SNIP compatibility is to use a separate field in the SHO Header to indicate the SNIP library from which each user PN code comes, and to independently identify the code libraries for S-Band and K-Band users (i.e. NASA, ESA, NASDA, or Unassigned). With this approach, WSC (and NCC) implementation and documentation would be consistent with the controlling SNIP document, it would eliminate any need for additional mappings of code identifications, and the implementation would not preclude supporting two users from different agencies in the same SHO. The additional fields for the library identification would be gained without increasing the SHO Header size by eliminating the use of a shuttle-dedicated pair of fields to identify SUPIDEN and VIC.

We suggest a phased implementation plan, as illustrated in Table 2 through Table 5 below, in which each phase is backwards compatible with the previous. This eliminates the need for simultaneous WSC and NCC deliveries. For the transition, it is necessary than NCC implement prior to WSC, and that both implement prior to any non-NASA codes being scheduled.

The final implementation is illustrated in Table 5 below. Note that the size of the User Code Assignment has not changed, limiting its value to the range zero through 99. If 100 unassigned codes are to be supported, rather than increase the size of this field, the field parameter of zero could be mapped to User Code 100. This would maximize the consistency between implementation and documentation without increasing the field size. In the case of S-Shuttle, WSC would interpret the contents of the S-Band User Code Assignment field (Bytes 52-53) as an S-Shuttle code in all cases where the S-Band User is a Shuttle, effectively ignoring the S-Band User Code Library field (byte 50).

Table 1 reflects the current as built implementation. This is documented in the Phase II Specification Appendix D, as well as the TDRS H,I,J NCC/FDF/WSC ICD 405-TDRS-RP-ICD-001.

Byte #	# of Bytes	Data Item
(Bytes 23-33 unaffected)		
34-40	7	SUPIDEN - Code assigned by NASA - normal user
41-42	2	Vehicle Identification Code (VIC) - Code assigned by NASA - normal user
43-49	7	SUPIDEN - Code assigned by NASA - Shuttle
50-51	2	Vehicle Identification Code (VIC) - Code assigned by NASA - Shuttle
52-53	2	User Code Assignment - normal user This subfield contains the code assigned for a normal (non-Shuttle) user (STDN 108)
54-55	2	User Code Assignment - Shuttle - K-Band This subfield contains the K-Band code assigned for Shuttle (STDN 108)
56	1	User Code Assignment - Shuttle, S-Band Forward This subfield contains the code assigned for a Shuttle, S-Band (STDN 108)
(Bytes 57-62 unaffected)		

Table 1. SHO Header, Current Implementation (Phase II Appendix D or 405-TDRS-RP-ICD_001)

Table 2 represents 530-ICD-NCC-FDF/WSC (Revision 4) the current definition of the SHO Header. This definition provides for a backward compatible, 'Two User in One SHO' capability which does not require simultaneous WSC and NCC deliveries. (The NCC 98 development is working to support this capability, while the WSC effort has not yet commenced). Although the 'Two User in One SHO' capability is not the subject of this discussion, the SNIP PN Code Compatibility topic can be treated independently and as such, the current definition is seen as the appropriate starting point for depicting the additional but unrelated changes necessary to effect accommodating SNIP PN Code Compatibility (without impact to the compatibility for 'Two Users in One SHO').

9.2.1 SHO Header

Byte #	# of Bytes	Data Item
(Bytes 23-33 unaffected)		
34-40	7	SUPIDEN - Code assigned by NASA - normal user
41-42	2	Vehicle Identification Code (VIC) - Code assigned by NASA - normal user
43-49	7	SUPIDEN - Code assigned by NASA - Shuttle
50-51	2	Vehicle Identification Code (VIC) - Code assigned by NASA - Shuttle
52-53	2	User Code Assignment - S-Band This subfield contains the code assigned for a user (STDN 108)
54-55	2	User Code Assignment - K-Band This subfield contains the K-Band code assigned for a user (STDN 108)
56	1	Copy of byte 53
(Bytes 57-62 unaffected)		

Table 2. SHO Header, Current Definition (530-ICD-NCC-FDF/WSC)

Table 3 depicts the first phase of implementation. This phase effectively places the Shuttle SUPIDEN and VIC in bytes 34-42 while retaining the same information for Shuttle in bytes 43-51 for backwards compatibility with WSC.

The outer most change bars are the ones in effect, with each tables change bars being those changed from the previous table

9.2.1 SHO Header

Byte #	# of Bytes	Data Item
(Bytes 23-33 unaffected)		
34-40	7	SUPIDEN - Code assigned by NASA - normal user **and Shuttle**
41-42	2	Vehicle Identification Code (VIC) - Code assigned by NASA - normal user **and Shuttle**
43-49	7	SUPIDEN - Code assigned by NASA - Shuttle
50-51	2	Vehicle Identification Code (VIC) - Code assigned by NASA - Shuttle
52-53	2	User Code Assignment - S-Band This subfield contains the code assigned for a user (STDN 108)
54-55	2	User Code Assignment - K-Band This subfield contains the K-Band code assigned for a user (STDN 108)
56	1	Copy of Byte 53
(Bytes 57-62 unaffected)		

Table 3. Phase I, NCC

Phase II (Table 4) is the WSC move to rely only on bytes 34-42 for SUPIDEN and VIC for Shuttle as well as all other users, as was provided for by Phase 1. Although WSC currently detects SHOs as being for Shuttle using SHO Subheader 3, bytes 34-42 and 43-51 are used by WSC for local display of the composite user schedule (includes SIC/VIC), as well as for specific Shuttle inputs for internal tables used in the reservation and conflicting of WSC DIS Shuttle equipment for overlapping SHOs, etc. When completed, this frees up bytes 43-51 for redefinition and use.

9.2.1 SHO Header

Byte #	# of Bytes	Data Item
(Bytes 23-33 unaffected)		
34-40	7	SUPIDEN - Code assigned by NASA - normal user and Shuttle
41-42	2	Vehicle Identification Code (VIC) - Code assigned by NASA - normal user and Shuttle
43-49	7	**Spare**
50-51	2	**Spare**
52-53	2	User Code Assignment - S-Band This subfield contains the code assigned for a user (STDN 108)
54-55	2	User Code Assignment - K-Band This subfield contains the K-Band code assigned for a user (STDN 108)
56	1	Copy of Byte 53
(Bytes 57-62 unaffected)		

Table 4. Phase II, WSC (Spare Bytes Available)

Phase III (Table 5) defines 'new' spare fields for SNIP PN Code Compatibility. During Phase II, the NASA library is the default (as it is today without explicit specification). In order to avoid simultaneous deliveries, the backward compatible definition of a default NASA library using ASCII Space (Spare) is retained to bootstrap into the final implementation, after which the need to retain ASCII space disappears and may be removed.

9.2.1 SHO Header

Byte #   # of   Data Item
            Bytes

(Bytes 23-33 unaffected)

Byte #	# of Bytes	Data Item
34-40	7	SUPIDEN - Code assigned by NASA
41-42	2	Vehicle Identification Code (VIC) - Code assigned by NASA
43-49	7	Spare
50	1	**User Code Library - S-Band, normal user (See Note 1 below)** **This subfield contains the code library from which the S-Band user normal user code assignment is made (Space Network Interoperable PN Code Libraries)** **1 = NASA** **2 = ESA** **3 = NASDA** **4 = Unasigned**
51	1	**User Code Library - K-Band** **This subfield contains the code library from which the K-Band user code assignment is made (Space Network Interoperable PN Code Libraries)** **1 = NASA** **2 = ESA** **3 = NASDA** **4 = Unasigned**
52-53	2	User Code Assignment - S-Band This subfield contains the code assigned for a user (**Space Network Interoperable PN Code Libraries**)
54-55	2	User Code Assignment - K-Band This subfield contains the K-Band code assigned for a user (**Space Network Interoperable PN Code Libraries**)
56	1	**Spare**

(Bytes 57-62 unaffected)

Notes:

1.   Byte 50 is not applicable for S-Shuttle services. For S-Shuttle services, bytes 52-53 identify the S-Shuttle Code Assignment from the S-Shuttle Library (Space Network Interoperable PN Code Libraries).

Table 5. Phase III (final), WSC and NCC (NCC implementation must precede WSC implementation, to allow use of non-NASA codes)